

Math 33B: First Order Equations

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1. Solve the following initial value problem:

$$\frac{dy}{dx} = 2e^y x, \quad y(0) = 0$$

What is the interval of validity for your solution?

2. Solve the following first order equation:

$$y' = -\frac{3y}{x} + \frac{\sqrt{1+x^2}}{x^2}$$

3. Solve the following exact equation:

$$y^2 e^{xy} + (e^{xy} + xye^{xy} + 1) \frac{dy}{dx} = 0$$